

are:—(1) Analytical chemistry, G. von Knorre; (2) inorganic chemical products, A. Heinecke, director of the Berlin porcelain manufacture; (3a) mining and metallurgy, G. Weeren; (3b) explosives, W. Will; (4a) organic products (including tar), H. Wichelhaus; (4b) dyes, A. Lehne; (5) sugar, A. Herzfeld; (6) fermentation and starch, M. Delbrück; (7) agricultural chemistry, O. Kellner; (8) Hygiene, E. A. Merck; subsections (a) foods, K. von Buchka; (b) pharmacy, H. Thoms; (c) hygiene, M. Rubner; (9) photochemistry, A. Miethe; (10) electro- and physical chemistry, H. Böttinger (of Elberfeld); (11) legal and economical questions, C. A. von Martius. Before adjourning each day, the sections, however, nominated the president and vice-presidents for the following meeting. As a result, the time limits, twenty minutes for the reading of a paper, five minutes for each speaker, were not well adhered to. Each speaker is at once presented with a slip of paper on which he is to condense his remarks for publication in the daily journal or later in the reports. Some sections gave brief abstracts of the proceedings in the daily journals, others merely stated titles of papers and names of authors and speakers. A not inconsiderable number of the 457 reports and papers announced were not read owing to the—frequently only momentary—absence of the authors. Brief abstracts of some of the most important papers will follow.

H. BORNS.

NOTES.

THE annual conversazione, or ladies' soirée, of the Royal Society will be held on Friday, June 19.

PROF. J. J. THOMSON has had the honorary degree of doctor of science conferred upon him by the Columbia University, New York.

SIR OLIVER LODGE delivered the Romanes lecture in the Sheldonian Theatre, Oxford, on Friday last, on the subject of "Modern Views of Matter."

A GENERAL meeting of the Institution of Mining Engineers will be held in London on Thursday, July 2, and the following day in the rooms of the Geological Society.

MR. E. T. WHITTAKER, of Trinity College, Cambridge, will deliver an address before the Mathematical Society of University College, London, on Thursday, June 25, at 5.30 p.m., on "Some Present Aims and Prospects of Mathematical Research."

THE *Moniteur Officiel du Commerce* of Paris announces that an International Exhibition of the Industrial Appliances of Alcohol will be held at Rio de Janeiro in August.

A REUTER telegram from Cape Town states that the *Gauss* expedition has disproved the existence of Termination Island, which is marked on maps, the expedition passing over the alleged site of the island.

THAT the Soufrière in St. Vincent is still in a state of slight agitation is recorded by Dr. E. O. Hovey (*Sentry*, Kingstown, March 13). Outbursts issue from time to time from the centre of the lake in the crater. The most impressive changes which have taken place are in the erosion of the lately-erupted volcanic material, and he estimates that twenty-five million tons have been carried to sea from the valley of the Wallibou.

WE referred last week to the demonstration of the practical working of the Marconi long-distance wireless telegraphy given by Prof. Fleming during his lecture at the Royal Institution. Prof. Fleming has written to the *Times*

complaining that the experiments were made particularly difficult to carry out towards the end of the lecture as the signals were being wilfully interfered with by an outside source. Mr. Nevil Maskelyne, in a reply to Prof. Fleming's letter, admits that he was the author of the interference, which was designed to demonstrate that the Marconi Company was not justified in its claim that it had solved the question of interference. A lecture at the Royal Institution scarcely seems a suitable occasion for settling commercial or semi-scientific disputes, nor can the result of the experiment be regarded as convincing. It shows, no doubt, that it is possible for an outsider to interrupt the signalling, but then it is also possible to throw stones at telegraph wires and break them; it does not demonstrate that two different systems working legitimately side by side would interfere with one another when the ordinary precautions necessary in commercial work were being taken.

LAST week telephonic communication was opened between London and Brussels. The line is particularly interesting, as the submarine portion forms the longest submarine telephone cable yet laid. The total length from St. Margaret's Bay (Dover) to La Panne, Belgium, is a little more than forty-seven miles; this is rather more than double the length of the Dover-Calais cable (twenty-three miles), which forms part of the London-Paris telephone line. The cable was made by Henley's Telegraph Works, and was laid in three sections by the *Alert* and the *Monarch*, the two joints being made at sea. The *Alert* laid $16\frac{1}{2}$ miles of cable, chiefly in the shallow water off the Belgian coast, the remaining $30\frac{1}{2}$ miles being laid by the *Monarch*; the cable crosses one of the Anglo-Belgian telegraph cables in deep water at about one-third of the total distance from La Panne. The length of the whole line from London to Brussels is 210 miles, made up as follows:—83 miles overhead lines in England, 80 miles overhead lines in Belgium, and 47 miles submarine cable.

THE promoters of the mono-rail high speed electric railway between Liverpool and Manchester hope to be able to start the work of construction this summer. When the railway is completed, a service of trains running at 110 miles an hour will be started; this will reduce the time taken over the journey from Liverpool to Manchester from forty to twenty minutes. Those interested in the scheme regard it as being the prelude to a reorganisation of express railway service throughout the country, and believe that once the possibility of working at these high speeds has been clearly demonstrated, the railway companies will be induced to build special mono-rail tracks alongside their existing lines for express services. It is already rumoured that the Great Western Railway is considering the advisability of constructing such a track for an express service between Bristol and London. In connection with high speed traction on railways, the experiments to be carried out in Germany during the next few weeks will be watched with interest. All the leading locomotive builders and electrical firms have been invited to submit designs, and trials will be made on the lines between Hamburg, Hanover and Berlin; it is hoped to attain speeds of 90 to 100 miles an hour with safety.

MR. A. MEEK informs us that a full-grown male beluga (*Delphinapterus leucas*) came ashore at the mouth of the Tyne on June 10, and was captured by the salmon fishermen. It measured 14 feet 2 inches. The specimen has already been cut up by the purchasers, so that it was possible to see that the teeth numbered eight on each side of each jaw, or thirty-two altogether, and that there were

eleven ribs on each side. The skeleton is to be presented to the Hancock Museum or to the Durham College of Science. Mr. Meek states that, so far as he is aware, an example of this species has not before been caught south of the Forth.

THE establishment of an economic tripos in the University of Cambridge will mark an important step in the movement which it is to be hoped will ultimately break down the barrier at present existing between the university man and the man of business. The proposed tripos has been warmly approved by a number of leading representatives of the railway, ship-owning, financial, mercantile, and manufacturing interests, as well as by prominent members of the Government. The tripos as proposed will consist of two parts, of which the first is to be taken in the second year, and will not qualify for a degree except in conjunction with some other examination. The syllabus of the first part includes (1) an essay paper; (2) one paper on the existing British Constitution; (3) two papers on recent economic and general history; (4) three papers on the general principles of economics. The historical part leads up to part ii., where specialisation is encouraged. In both parts questions, not all of which are optional, may be set, including quotations from French or German writers, so that a knowledge of these languages is essential. Among the careers for which the proposed tripos will afford a valuable training are those of the country squire, the politician, the business man, and the administrator of charities. It is only by the study of the principles of economics and political science treated as exact sciences, but founded upon actual facts of business life, that our country can hold its own against the competition of other countries where these principles are so studied, and can thus maintain that supremacy which it was able to obtain under entirely different conditions by rule of thumb methods and by pure speculation.

THERE was little new in the narrative of the British Antarctic Expedition given by Sir Clements Markham at a special meeting of the Royal Geographical Society on June 10. Commander Scott's short record of the voyage of the *Discovery* and work of the expedition, brought back by the relief ship *Morning* at the end of last March, and printed in NATURE of April 2 (vol. lvii. p. 516), contained the substance of what has been achieved. Some of the results of explorations were summarised in a subsequent number (p. 12). The paper read by Sir Clements Markham confirmed the information given in these two messages. The description and discussion of the scientific results are left until Commander Scott and his fellow-explorers return to this country with details of their work. In proceeding along the ice-barrier, the furthest easterly point reached was $152^{\circ} 30'$ W., and at this extremity extensive land, to which the name King Edward VII. land has been given, was found, rising to heights of 2000 to 3000 feet. The ice-barrier was studied from this point to Cape Crozier, and its height was found to vary from 30 to 900 feet. The winter quarters of the ship were in lat. $77^{\circ} 50'$ S., which is more than 500 miles further south than any ship has wintered before. Meteorological observations made in this position over a period of two years will be of great value. The most southerly point reached by a sledge journey from the ship was lat. $82^{\circ} 17'$ S., long. 163° E., and from it a range of mountains was seen extending as far as visible in a south by east direction. The journey during which these observations were made occupied ninety-four days, and the explorers must have travelled more than 980 statute miles. Another journey was made to the west of the ship, the

farthest point reached being in lat. $77^{\circ} 21'$ S., long. $157^{\circ} 25'$ E. The horizon to the west of this point was unbroken and clear. An altitude of 9000 feet was attained at a distance of 142 miles from the ship as the crow flies. Many interesting photographs were shown at the meeting, and judging from them and the brief messages brought back by the *Morning*, the expedition will contribute much to our knowledge of the physical and biological conditions of South Polar regions.

A SHORT account of one of the sections of the International Congress of History was given in NATURE of April 30 (vol. lvii. p. 613). A memoir by Prof. Ernest Lebon, describing a plan for an analytical bibliography of contemporary works on the history of astronomy, was among the papers presented to the congress, and has since been laid before the Paris Academy of Sciences. At the meeting of the Academy at which the memoir was received, M. Paul Appell, Dean of the Faculty of Sciences of the University of Paris, spoke in favour of Prof. Lebon's plan, and said that the bibliography would not only be valuable to scientific historians, but would also be welcomed by all astronomers. The May number of the *Bulletin de la Société astronomique de France* contains the titles of the chapters of Prof. Lebon's work, and the names of the authors of books and papers which are summarised in it.

DURING a heavy thunderstorm at Heppner, Oregon, on Sunday last, a remarkable downpour of rain occurred, producing a destructive flood, which caused the death of more than three hundred people. Heppner is situated in a gulch through which a stream runs usually only a few feet in width. On Sunday a dense cloud suddenly covered the mountain overlooking the town, and the rain which followed produced a great mass of water which rushed down the mountain and carried everything before it, the little stream being quickly converted into a deep torrent about four hundred feet wide. The flood swept a clean path more than a mile long and two blocks wide through the town.

THE daily weather report issued by the Meteorological Office on Saturday morning, June 13, showed that the area of high barometric pressure lying outside our Atlantic coasts had to some extent given place to a disturbance of a very complex character which occupied the whole of England. By about midday heavy rain set in over a great part of the country, and continued persistently, especially over the southern districts, during the following days. In the neighbourhood of the metropolis rain continued with scarcely any intermission for a period of 59 hours, and the amount measured in the week was 4.82 inches, being nearly 3 inches in excess of the average for the month. In the north of London the fall was even heavier than in the south, and amounted to about $2\frac{1}{2}$ inches in the 24 hours ending 8h. a.m. on Monday, while the temperature, owing to the continuation of northerly winds, was about 20° below the average. To find such a heavy fall of rain in June we have to go back to 1860, when an amount of 5.8 inches was measured at Greenwich, but this was spread over twenty-three days. The average rainfall for the neighbourhood of London is 1.93 inches only for the month of June. The heavy rainfall was entirely due to the lingering of the low barometric pressure to the southward.

IN the *Quarterly Journal* of the Royal Meteorological Society for April last, Mr. W. Marriott contributed an interesting paper on the earliest *telegraphic* daily meteorological reports and weather maps. The paper refers specially to reports relating to this country, although mention is made of the maps compiled in the United States

by the Smithsonian Institution by means of telegraphic reports, in 1849, and some years previously, from monthly returns, by Prof. Espy. The first telegraphic weather report in this country appears to be that published by the *Daily News* on August 31, 1848. The first printed daily weather map was that issued in August, 1851, at the great exhibition in Hyde Park. The first Government daily weather report was prepared by Admiral FitzRoy, and issued to London newspapers in 1860. In January, 1871, the *Shipping and Mercantile Gazette* published daily wind charts, prepared by the Meteorological Office, and in March, 1872, that office issued its first daily weather maps. The 6h. p.m. weather maps published by the *Times*, and prepared by the Meteorological Office, commenced on April 1, 1875. As Mr. Marriott has also quoted the weather maps prepared by Mr. Glaisher from July, 1849, which do not appear to have been entirely based on telegraphic reports, we may direct attention to one or two early English investigations of a somewhat similar nature. In the report of the Meteorological Department of the Board of Trade for the year 1857, Admiral FitzRoy directed attention to the desirability of collecting synchronous weather observations, and subsequently some hundreds of synchronous charts were prepared in the office, although not published, excepting for the time of the "Royal Charter" storm (October, 1859). Mr. Francis Galton discussed the daily weather for the month of December, 1861, and some 600 maps and diagrams were published in "*Meteorographica*" (Macmillan, 1862). With respect to work abroad, it may not be out of place to state that between 1816-20 H. W. Brandes apparently prepared synchronous weather charts for each day of the year 1783, from the Mannheim and other observations. Although the charts were not published, the data on which they were constructed were quoted in his "*Beiträge zur Witterungskunde*" (Leipzig, 1820), and one of the maps (for March 6, 1783) was reconstructed and published in "*Les Bases de la Météorologie dynamique*," by Dr. Hildebrandsson and M. Teisserenc de Bort (Paris, 1898).

At the recent flower show held in the Temple grounds, amongst the hardy shrubs there was displayed a profusion of maples, many of which hail from Japan. An interesting article on these and other Japanese trees which commend themselves by reason of their quick growth and free flowering habit is contributed by Mr. J. H. Veitch to the last number of the *Journal* of the Royal Horticultural Society. Amongst the more technical contributions to be found in the same publication, one of considerable importance is the account of manurial experiments with vegetable crops carried out by Dr. Dyer and Mr. Shrivell.

In the absence of the director, the annual report for 1902 of the Royal Botanic Gardens, Ceylon, has been issued by the assistant director, Mr. J. B. Carruthers. During the year an estate of 500 acres was acquired with the object of turning it into an agricultural experiment station, and was placed under the charge of Mr. H. Wright. The value of a special establishment for dealing with agricultural matters of economic importance is evident, and the presence of aggravated canker amongst the cacao trees growing on the land acquired for the purpose provided an opportunity for demonstrating the scientific treatment of this disease. In the ornamental lake of the Peradeniya Gardens an artificial island was constructed of mud taken from a depth of 8 to 10 feet below the water. It is expected that an instructive object lesson in the seed dispersal of terrestrial plants will be afforded by the systematic examination of the plants which develop on this area. A first attempt to raise worms and silk cocoons in the island is recorded by

Mr. E. E. Green. In spite of untoward circumstances, of which the principal was a shortage of mulberry leaves or any other efficient substitute, the few cocoons raised were quite satisfactory, and it seems probable that the industry might with advantage be taken up by the natives.

DR. HÄCKER, whose investigations on the cytology of Copepods are well known, has recently (*Jen. Zeitschr. f. Naturw.* 1902) reinvestigated the question as to the permanence of the maternal and paternal chromosomes in the germ cells of the offspring. The result has been not only to show that the parental chromosomes remain distinct in the nuclei of the germ tract of the young organisms, but that the processes associated with the "reduction-divisions" may prove to be even more complicated than had previously been supposed. It appears that in the early prophase of the heterotype mitosis, tetrads are formed in numbers equal to those of the somatic chromosomes. These are divided, during the first polar mitosis, by an "equal" division, twelve dyads travelling to the respective poles. These the dyads fuse longitudinally in pairs, thus giving rise to the reduced number (6) of chromosomes. The next mitosis divides these in such a way that the collaterally fused pairs are transversely split, and thus a true qualitative "reduction division" is brought about. It would thus appear that the first of the two divisions effects the mingling of the parental chromosomes, whilst the second ensures a qualitative distribution of those originating from the penultimate (grandparent) generation. This occurs in such a way that each of the six chromosomes ultimately passing to the daughter-nuclei consists of halves contributed by two different grandparents.

WE have received the report (*Aarsberetning*) of the Bergen Museum for 1902.

NO. xi. of the *Sitzungsberichte* of the Vienna Academy for the current year contains a *résumé* of the results of Dr. F. Steindachner's recent expedition to Brazil.

THE "dragonets" (Callionymidae) and allied fishes of Japan are described by Messrs. Jordan and Fowler in No. 1305 of the *Proceedings* of the U.S. Nat. Museum, several new forms being recorded.

AMONG the contents of the June number of the *Entomologist* we find a paper on the parasitic Hymenoptera and Tenthredinidae collected by Mr. Whympere in the Andes of Ecuador, and a continuation of Miss Sharpe's list of butterflies from British East Africa.

THE *Proceedings* of the South London Entomological and Natural History Society for 1902 is illustrated by two plates, devoted to the life-history of the crustacean *Argulus foliaceus*, which lives parasitically on sticklebacks. The council reports that the affairs of the Society continue to prosper, the number of members again showing a slight increase.

A REVISION of the American moths of the family Gelechiidae, with descriptions of new species, by Mr. A. Busck, of the Department of Agriculture, appears in vol. xxv. (No. 1304) of the *Proceedings* of the U.S. Nat. Museum. No. 52 of the *Bulletin* of the U.S. Nat. Museum, comprising 723 pp., is devoted to a list of North American Lepidoptera, which will doubtless prove of great value to entomologists.

In their thirty-first annual report (for 1902) the directors of the Zoological Society of Philadelphia record a general satisfactory progress on the part of that institution. With the exception of a slight diminution, probably due to un-

favourable weather, during three months, the number of admissions to the gardens shows a steady increase throughout the year. A number of species of animals have been exhibited for the first time in the menagerie during the year.

"SAWDUST AND FISH LIFE" is the title of an article in a recent issue of the *Transactions* of the Canadian Institute. From the result of experiments in aquariums, the author, Dr. A. P. Knight, gives reasons for the belief that the sawdust thrown in large quantities into the Canadian rivers is very harmful to fish; but from actual observations in the rivers themselves, it does not appear that the destruction is as great as might have been expected.

We have received a copy of an "Outline of Special Course in Natural History for Training Colleges and King's Students," just issued by the Marischal College, Aberdeen. It contains outlines for demonstrations on classification, the adaptation of animals to their surroundings, and examples of the leading types of animal life, concluding with suggestions for seasonal studies in natural history. Although the illustrations are somewhat crude, the pamphlet seems well adapted to its purpose.

THE Liverpool Marine Biology Committee is to be congratulated on the issue of the tenth fasciculus of the well-known "L.M.B.C. Memoirs," this part, of which Prof. J. R. A. Davis and Mr. H. J. Fleure are the joint editors, being devoted to the common limpet (*Patella*). The mode of treatment of the subject follows the line of the earlier issues, and the illustrations are numerous. The authors believe that, although limpets are rightly included among the lower gastropods, yet that they form an isolated type, which has been specialised in connection with their adoption of the habit of adhering to exposed surfaces, and making limited excursions for the purpose of feeding.

THE report on the examination of food, drugs and public water supplies reviewing the work of the Laboratory of Hygiene of the State of New Jersey, U.S.A., has reached us. It deals especially with the analytical methods employed in testing foods and drugs; these are detailed, and should be of considerable service to public analysts in this country.

We have received the "Year Book" of the Livingstone College. The College trains missionaries in the elements of medicine and hygiene, the curriculum extending over a period of nine months. During this time the students are systematically trained in the elements of anatomy and in hygiene, nursing, cooking, &c., suitable to tropical climates, as well as in the prevention and treatment of the ailments they are likely to meet.

A COPY of the report of the Medical Officer of Health for the City of London for 1902 has been received. It contains an account of the procedures adopted by the Corporation of London for the sanitary protection of its citizens, some of which have already been noticed in these columns, e.g. the prohibition of spitting, and condemnation of typhoid-contaminated shell-fish. A point of interest is that, though the day population of the City probably exceeds 359,000, only 339 births were registered during 1902.

THE geology of the country near Leicester is the title of a memoir, by Mr. C. Fox-Strangways, lately issued by the Geological Survey. It is accompanied by a colour-printed map of the area, which includes Mount Sorrel and Leicester on the west, and parts of Rutlandshire on the east. Excepting for the granite quarries at Mount Sorrel, numerous brick-yards, sand and gravel pits, and occasional

lime-works, the country is essentially one of meadow and pasture, and a famous hunting ground, the subsoil being for the most part clay—Boulder-clay, Lias-clay, Keuper Marl, and Alluvium. As most of the area is drift-covered, this new map differs very largely from the old series geological survey map, on which only the "solid" geology was depicted. In addition this new map has alongside it a colour-printed section which gives an excellent and instructive view of the structure of the ground. In the memoir Mr. Strangways gives full particulars of the strata, a catalogue of the fossils from the Trias and Lias of Leicestershire and Rutland, and numerous records of borings and well-sections. A photographic plate shows the weathered crags of granite at Mount Sorrel, grooved by the erosive power of wind-drifted sand in Triassic times, as pointed out by Prof. Watts. The price of the memoir is 3s., and of the map 1s. 6d.

A "Subject List of Works on Architecture and Building Construction, in the Library of the Patent Office," has been published in the Patent Office library series. The subject list consists of two parts, viz. a general alphabet of subject headings, with entries in chronological order of the works arranged under these headings; and a key or summary of these headings shown in class order. Copies of the publication can be obtained at the Patent Office, Chancery Lane, W.C., price sixpence.

A SECOND revised edition of the "Smithsonian Physical Tables," prepared by Prof. Thomas Gray, has been published by the Smithsonian Institution. This edition differs from that issued in 1897 in a few particulars only, the chief alteration being that the table of electrochemical equivalents now contains columns showing atomic weights with $O=16$ and $H=1$ based upon the report of the International Committee on Atomic Weights. The table giving values of the density and volume of water between -10° C. and 100° C. needs revision, the volumes from 46° to 100° being obviously wrong in the second decimal place. This, however, is a small point, and can be easily corrected by anyone using the tables. By issuing works of this kind, which are very valuable to teachers and investigators, but for which the demand is necessarily limited, the Smithsonian Institution is doing great service to science.

THE first number of the "Year Book" of the Carnegie Institution of Washington contains detailed information of what has already been accomplished for the encouragement of scientific research as the result of the munificence of Mr. Carnegie. Upwards of 38,000l. has been voted to assist a number of men of science in their investigations, but the fund, large as it is, has proved inadequate to meet all the requests for aid received by the trustees. As a consequence it has been found necessary to limit the activities of the institution—ground already occupied will be avoided, the systematic education of students will not be undertaken, and sites and buildings for other institutions will not be provided. It is to be understood, the "Year Book" states, that apparatus and materials purchased to assist investigators are to be regarded as the property of the Carnegie Institution. The persons assisted are expected to report upon the methods followed and the results obtained, and to state in the published results that aid was received from the Institution. Appropriations are to be made from time to time for the printing of papers of acknowledged importance. To secure the counsel of experts, special advisers have been, and will be, invited from time to time for consultation. The first appendix, which runs to 238 pages of the "Year Book," consists of reports of eighteen advisory committees on the chief branches of scientific

knowledge. Another appendix deals with the proposed explorations and investigations on a large scale, and is contributed to by several well-known American men of science.

A STRIKING illustration of the enormous advance that has taken place in chemical manipulation during the past two or three years is afforded by a paper, in a recent number of the *Berichte*, on the "Evaporation and Boiling of Metals in Quartz-glass and in the Electric Furnace in the Vacuum of the Kathode-light." Dr. F. Krafft there states that the quartz tubes could be safely heated to 1200° , and with care up to 1400° C., even when exhausted to the low pressure required for the production of the kathode-light in a vacuum tube, and that even when containing metals they could be safely taken from the furnace at 1200° , allowed to cool in the air without annealing; and then replaced in the furnace without any risk of fracture. By using an electric furnace it was possible not only to regulate the temperature within 2° or 3° between 18° and 1400° C., but also to connect the quartz tubes to the pump by means of a ground-glass joint made tight with wax, the wax remaining unmelted although within a few inches of the hottest part of the furnace.

THE results achieved by the methods described in the foregoing note were remarkable. The only vapour in the quartz tube was that of the metal, which extended from the surface of the liquid to the top of the furnace, above which condensation took place. Under this almost inconceivably low pressure cadmium boiled at 420° , *i.e.* below the boiling point of sulphur, zinc at 545° , and bismuth below 1000° , the temperature of the furnace being about 150° above that of the boiling metal. Lead could be rapidly distilled with a furnace temperature of 1180° , and antimony at $775-780^{\circ}$. Silver began to evaporate fairly rapidly at 1200° , but did not boil at 1340° ; copper showed a distinct, though slight, evaporation at 1315° , but gold, even at 1375° , the highest temperature reached in the experiments, gave only a small mirror of silver, and below it a tiny distillate of gold weighing less than 2 mg. It is of interest to note that the boiling points in an absolute vacuum of these metals, which probably lie at about 1400° , 1600° , and 1800° respectively, are in the order of increasing valency, and not in the order of their atomic weights.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*), a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. C. S. Birch; a Two-spotted Paradoxure (*Nandinia binotata*), two Senegal Touracous (*Turacus persa*) from West Africa, presented by Mr. James Drew; a Ring-tailed Coati (*Nasua rufa*) from South America, presented by the Hon. Sibyl Edwards; a Patagonian Cavy (*Dolichotis patachonica*) from Patagonia, presented by Sir E. G. Loder; a Common Quail (*Coturnix communis*), British, presented by Mr. J. Woodward; an Adanson's Sternother (*Sternotherus adansonii*) from West Africa, a Pale Lizard (*Agama pallida*), an Egyptian Eryx (*Eryx jaculus*), a Blunt-nosed Snake (*Tarbophis obtusus*), a Schokari Sand Snake (*Psammophis schokari*), a Diadem Sand Snake (*Lytrohynchus diadema*) from North Africa, presented by Captain Stanley Flower; a Stair's Monkey (*Cercopithecus stairsi*) from British East Africa, a Green Monkey (*Cercopithecus callitrichus*), an Eroded Cinixys (*Cinixys erosa*) from West Africa, a Black-headed Lemur (*Lemur brunneus*), a Grey Lemur (*Hapalemur griseus*) from Madagascar, five Grey Monitors (*Varanus griseus*), five Spiny-tailed Mastigures (*Uromastix acanthinurus*), eight Ocellated Sand Skinks, a Corais Snake (*Coluber*

corais) from South America, a King Snake (*Coronella getula*), a Mocassin Snake (*Tropidonotus fasciatus*) from North America, a Carpet Python (*Python variegata*) from Queensland, a Rhesus Monkey (*Macacus rhesus*, var.), two Indian Rat Snakes (*Zamenis mucosa*) from India, deposited; a Burrhel Wild Sheep (*Ovis burrhel*), an Axis Deer (*Cervus axis*), born in the Gardens.

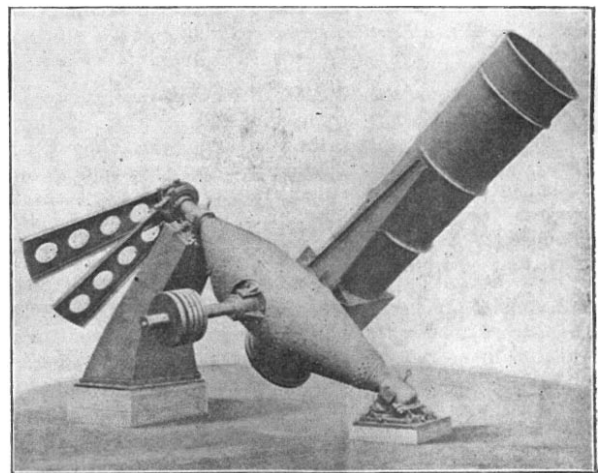
OUR ASTRONOMICAL COLUMN.

CONNECTION BETWEEN SUN-SPOTS AND ATMOSPHERIC TEMPERATURE.—M. Charles Nordmann has recently completed a discussion of the effect of sun-spots on the mean annual temperature of the earth's atmosphere in tropical regions. The period under discussion extends from 1870 to 1900, and the method of discussion is analogous to that published by Köppen in 1873, which dealt with the period 1830 to 1870.

M. Nordmann has compared the mean annual variations of temperature from the normal, as obtained from the observations made at thirteen tropical stations situated in various longitudes, with Wolf's numbers for sun-spot frequencies during the same period, and from the two curves obtained by plotting the two sets of numbers he has arrived at the following conclusion:—"The mean terrestrial temperature follows a period sensibly equal to that of solar spots; the effect of spots is to diminish the mean temperature, *i.e.* the curve which represents the variations of temperature is parallel to the inverse curve of sun-spot frequencies (*Comptes rendus*, No. 18).

THE CROSSLEY REFLECTOR OF THE LICK OBSERVATORY.—This reflector, it will be remembered, was presented to the Lick Observatory by Mr. Crossley, of Halifax, Yorks, and contains one of the splendid mirrors made by the late Dr. Common. It has an aperture of 3 feet, and a focal length of 17 feet 6 inches. When remounted and used at Lick it was found that the instrument was unsuitable for long exposures on account of flexure and other defects, therefore a new mounting has been devised and constructed by Messrs. Harron, Rickard and McCune, of San Francisco, and is found to work satisfactorily.

The polar axis is 14 feet long, and is so raised as to allow the instrument to be used in all positions. As shown in the accompanying illustration, this axis rests on two piers, the northern one consisting of an inclined steel



pillar, 8 feet high, resting on a concrete and brick foundation which is 6 feet high, whilst the bearing on the southern end, carrying the altitude and azimuth adjustments, rests directly on the brick and concrete foundation, the downward thrust being borne by hardened steel balls. The telescope tube is carried by the strong steel declination axis, and the mirror is contained by a cast-iron cell in the lower cylindrical section of the steel tube, whilst the photographic plate holder, with the usual adjustments, is placed